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Aesculus parviflora

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THE MORRIS ARBORETUM

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THE ASSOCIATES, through whose interest and generosity *The Bulletin* and certain other undertakings of the Arboretum are made possible, is an informal group of individuals interested in encouraging and furthering the educational and research endeavors of the Morris Arboretum.

CLASSES OF MEMBERSHIP

Contributing	$ 5.00 a year	Supporting	$ 25.00 a year
Sustaining	$10.00 a year	Sponsoring	$100.00 a year
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Arboretum Activities

Open House

On Sunday afternoon, May 20, the Arboretum held the first Open House for its Associates and neighbors. This date was selected to coincide with the optimum blooming period of our main Azalea plantings and the occasion, favored as it was by superb weather, proved a memorable one.

Some 200 persons attended this function and partook of refreshments served on the porch of the Morris Mansion. Guided tours under competent leaders set out at regular intervals to visit the Azaleas and other groups of plants.

Members of the Advisory Council, under the chairmanship of Mrs. E. Florens Rivinus, served as hostesses to welcome our guests. The enthusiastic response to this occasion would seem to indicate that such an Open House should become an annual feature of the Arboretum's activities.

Recreation Area

Thirty-eight groups have held outings at the Arboretum's Recreation Area since April 20 of this year. Among the organizations to take advantage of this service were all four classes from the

(Continued on page 39)

The Story of the Cultivated Horse-chestnuts

HUI-LIN LI

Introduction

Among shade trees, Horse-chestnuts and Buckeyes have a special appeal because of their very striking foliage and flowers. The large plamately compound leaves are unique among trees of the temperate regions. The long upright clusters of colorful flowers are showy and conspicuous. These, together with the stately, compact pyramidal shape make them among the most popular ornamental trees in all continents of the northern hemisphere.

Most people consider the trees to be magnificent in both foliage and flowers. Wilson (1920), for instance, speaks enthusiastically of the Common Horse-chestnut as the most handsome exotic flowering tree in the Eastern United States. But dissenting view is sometimes also expressed such as by Wyman (1951) who considers the tree coarse in foliage texture, flower, and fruit and a "dirty," one, as it is always dropping something.

THE GENUS AESCULUS

The Horse-chestnuts and Buckeyes belong to the genus *Aesculus,* of the Hippocastanaceæ or the Horse-chestnut family, a genus of some 15 species of trees or shrubs of the temperate regions of the northern hemisphere. The leaves are oppositely arranged, each with 5-9 digitately disposed leaflets. The flowers are 4-5 petaled, white or showy-colored, and are borne in upright many-flowered clusters. The fruit is large, rounded, either smooth or prickled outside, splitting into 3 valves exposing the single large seed. The seed or nut is unfit for human consumption.

Native species are cultivated in Europe and Asia and also in North America. The bringing together of European and American species in cultivation, and the several different American species themselves, has resulted in the production of many hybrids, some superior to the parental species in certain qualities. The very l ge number of hybrids which have arisen in cultivation within the last 200 years renders this group a distinctive one in the genetics of trees and ornamentals. The significance of hybridity in this genus is further enhanced by the occurrence of chromosome doubling in certain forms, which renders these fertile and true-breeding and leads to the production of hybrids with intermediate chromosome numbers between the low and high chromosome-types. The story of hybridization in the genus *Aesculus* is documented by cytological studies and well illustrates what can be done in deliberate breeding of trees in many families and genera.

EUROPEAN SPECIES

The Common Horse-chestnut, *A. Hippocastanum,* native to the Balkan peninsula, is the only European species of the genus. It is a large tree, attaining a height of 100 feet, with 5-7-foliolate leaves, sessile leaflets, white flowers tinged with red and prickly fruit. It is the first of all shade trees to burst into leaf, and it is desirable not only as a street tree but also as a specimen tree in parks or private grounds.

In Europe and in England it is now widely planted and becomes such a common feature of the landscape that most people take it for granted that it is native. In England, the most famous planting is the avenue leading to the Hampton Court Place at Bushey Park on the bank of the Thames, a mile in length and 170 feet wide, and lined with 137 trees on each side set 42 feet apart. It was planted by the famous architect Sir Christopher Wren in 1699. The tallest trees are over 100 feet high and the show of blossom is truly spectacular. (Wilson 1920)

The native home of this species was long an enigma to botanists. Linnaeus considered the tree indigenous to northern Asia and DeCandolle thought that it came from northern India. Only Decaisne expressed the opinion that the plant was of European origin and this was confirmed, and the enigma finally solved by the discovery made by Orphanides of the tree growing in a wild state in the mainland of Greece (in a note in the French translation of Griesbach's Die Vegetation der Erde, made by M. de Tchihatschef, 1876). It is now definitely established that its native habitat is confined to northern Greece and Albania. Its occurrence in other regions is in all cases due to cultivation.

It is uncertain whether or not the Horse-chestnut was known to the ancient Greeks. The earliest record of cultivation is in Constantinople. The fruit was known as At-Kastan (Horse-chestnut) to the Turks who found them useful as a drug for horses suffering from broken winds or coughs (Loudon 1838, Wilson 1920).

Seeds of the Horse-chestnut were sent in 1570 from Constantinople to Vienna by Dr. von Ungnard, Imperial Ambassador to the court of Suliman II, and a tree was raised by the celebrated botanist Clusius. Seeds were brought to France from the Levant by Bachelier in 1615, and the tree was probably introduced into England at about the same time. (Loudon 1830).

Although the exact dates of many plants introduced into this country by early English settlers are

so often unknown, fortunately, as noted by Wilson (1920), the introduction of the Common Horse-chestnut into America is a matter of record. The exact date is noted in the letters published by William Darlington in his *Memorials of John Bartram and Humphrey Marshall,* in 1849. Seeds were first sent by P. Collinson in 1741 from London to John Bartram in Philadelphia and in 1763 Collinson learned of the flowering of his introduced Horse-chestnut. Collinson spoke also of the long Horse-chestnut avenue at Hampton Court(the trees were then 50 feet high), as "one of the grandest and most charming sights in the world". In recording this introduction, Wilson especially remarked that, based on his own experience, he considered the Horse-chestnut among the most difficult to transport safely and he marveled that in those days on slow sailing ships its introduction into the New World should have been successfully accomplished.

The Common Horse-chestnut is now widely planted and there are numerous garden forms which have originated in cultivation. There is a double-form 'flore pleno'. In leaf variations, there is 'Memmingeri' with yellow leaves, 'aureo-variegata' with yellow variegated leaves, 'laciniata' with narrowly lobed leaflets, and 'crispa' with stalked and broad leaflets. In habit 'pyramidalis' is upright, 'umbraculifera' is dense and globular, and 'tortuosa' has bent and twisted branches. All these garden forms are propagated by cuttings or grafting and are thus to be considered as clones.

Himalayan and Southern Asiatic Species

There are two species of *Aesculus* native to the Himalayan region and southern mainland Asia. One of them, the Indian Horse-chestnut, *A. indica,* a large tree to 150 feet high, is a common tree in the northwestern Himalayas from the Indus to Nepal, and also in Afghanistan. It occurs at elevations from 4,000 to 10,000 feet. The seed is given as food to cattle and goats, and, ground and mixed with ordinary flour, is also part of the diet of the hill tribes. (Elwes and Henry 1907). The tree is occasionally cultivated in England but it does not seem to have been introduced into North America.

Another species, *A. punduana,* occurs in the northeastern India, in Sikkim and Khasia Hills through Upper Burma, Thailand to Tonkin in Indo-China. It is a large tree with very large leaflets. Essentially a sub-tropical tree, it is not cultivated elsewhere.

Eastern Asiatic Species

Three species occur in eastern Asia: two in China and one in Japan, all of them occasionally known in cultivation in other temperate regions. Although the three species are distinct both morphologically and geographically, they have been much confused with each other in botanical as well as pre-scientific writings.

In northern and eastern China, the Chinese Horse-chestnut, *A. chinensis,* is widely grown as a shade and ornamental tree, especially on the grounds of Buddhist and Taoist temples. The tree is probably native to Shansi and Shensi in northern China and the present range is much expanded because of cultivation.

The Chinese Horse-chestnut is a medium-sized tree attaining a height of 75 feet. The leaves are composed of 5-7 large and stalked leaflets. The flowers are white and small, forming panicles about 8 inches long. The generally globular fruit is about ¾ in. across, more or less depressed above, and covered with warts but is not spiny.

In western China, in Szechuan and Hueph, there occurs a Horse-chestnut originally regarded as belonging also to *A. chinensis,* but Rehder (1913) separated it as a distinct species, *A. Wilsonii.* It is very similar to *A. chinensis* in general appearance, differing mainly in its hairy and longer-stalked leaflets, in its larger flowers, and in the more rounded fruit with larger seeds. It is a tree of the mountains, occurring in woods at elevations of 3000-6000 feet.

In Japan, there is found *A. turbinata,* which was formerly much confounded with the Chinese Horse-chestnut. The Japanese Horse-chestnut has stalkless instead of stalked leaflets and 5 instead of 4 petals. The flower is yellowish-white and the fruit is broadly pear-shaped. This tree is cultivated in Japan and also in some cities in eastern China.

In China *Aesculus* is often called Seven-leaved Tree, referring to the palmately compound leaves, or sometimes as Monkey-chestnut because of its original mountainous habitat and of the fruit unfit for human consumption.

A special significance is attached to the Horse-chestnut in China and Japan by the Taoists and the Buddhists. In the hills around Peking, and in many other parts of China, the tree is frequently planted on temple grounds which the Buddhist monks call So-lo. This is a transliteration of a Sanskrit name "Sala," which originally refers to *Shorea robusta* of India, one of the sacred trees of Buddhism. In a grove with a mighty "Sala" tree, the Buddha Guatama, founder of Buddhism, was born, his mother clutching a branch of the mighty tree. An even greater sanctity was given to this species because Guatama on his last mission died, lying on his cloak, which his disciple Anada folded and placed for him on the ground between two "Sala" trees (Burkhill 1946).

As *Shorea* is not hardy in northern China, Buddhists anxious to grow the tree about their establishments transferred the name to *Aesculus,* an attempt, as Burkhill says, made in a kind of desperation. Burkhill thinks that it is remotely possible that this substitution began in Kashmir monasteries

when, in their inability to grow *Shorea,* the monks substituted the Indian Horse-chestnut, *A. indica,* but he says this is not actually demonstrated. Thus, Burkhill asserts that "The Chinese, whose pilgrims were certainly familiar with Kashmir, for some unexplained reason took their *Aesculus chinensis* Bunge, which is very like *A. indica,* for 'Sala,' calling it 'So-lo,' planting it about their monasteries."

However, the substitution of the name is entirely of Chinese origin, and as noted by Burkhill, it is not concerned with the Kashmir plant. The reason for choosing this plant, which puzzles Burkhill, is to be found in the religious significance attached to the plant in China prior to its adoption by the Buddhists apparently only since the 16th century.

In China, *Aesculus* is also known by the name Tien-shi-li, or "Chestnut of the Heavenly Teacher"; this name appears first in the book, "Account of the products of Szechuan," by Sung Chi of the 11th century. It states that the tree is found only in the Ching-chen mountains of Szechuan and was reputed to be planted there by Tien-shi, the Heavenly Teacher, referring to the Taoist pope, Chang Tao-ling of the first century A.D., when he studied and meditated there, seeking for "Tao," or the truth. From the locality, apparently the name refers more specifically to *A. Wilsonii.*

Li Shi-chen, in his great herbal Pen Ts'ao Kang Mu of 1558, identifies this Tien-shi-li with the plants called So-lo, a name which he says was unknown in former times. Thus it is clear that the Buddhists adopted this plant almost five centuries after the Taoists attributed any significance to it.

Along with these attributions, the seeds of *Aesculus* were reported to have benign influence in exorcising demons. The transference of the sacred Buddhist tree "Sala" from *Shorea* of India to *Aesculus* in northern China, out of necessity because of climatic incompatibility, is thus apparently motivated by its original religious and superstitious significance.

American Species

There are no less than 10 species of *Aesculus* in North America, the largest concentration of the genus. These species, generally known as Buckeyes in America, are usually smaller trees or shrubs. They have mostly 5 leaflets.

Among the larger species, trees or sometimes large shrubs, there are about 7 species. There are two species in California, *A. Parryi* and *A. californica.* The latter, the California Buckeye, the more common species, is a tree 35 feet high and with white to rose-colored, fragrant flowers. It is in cultivation but suitable only for the southern states.

The largest American species is the Sweet Buckeye, *A. octandra* of eastern North America. It grows to a height of 90 feet, and bears flowers which are usually yellow. Another large tree is *A. sylvatica (A. neglecta),* native from North Carolina to Alabama, which attains a height of 60 feet, with pale yellow flowers.

Among the smaller trees is the Ohio Buckeye, *A. glabra,* state tree of Ohio, a tree to fifty feet tall with relatively small and bright red flowers. Another shrub or small tree of the same stature is *A. discolor* of the southern states, which bears yellow flowers flushed with red.

Among the species mentioned above, the most commonly planted ones are the Ohio Buckeye and the Sweet Buckeye. These two species have also been introduced into England and the European continent and are frequently planted there.

The remaining species are mostly shrubby. Among them are some valuable ornamentals for the lawn, such as *A. parviflora* and *A. splendens,* of the southeastern and the southern states respectively. The latter is a spreading shrub readily propagated by root-cuttings, and is especially valuable for its autumn flowers of a very beautiful red color.

Aesculus parviflora, which is known as the Bottle-bush Buckeye, is a shrub 3 to 10 feet tall, with white flowers and long exserted stamens. (See cover)[1] The plant spreads rapidly by horizontal runners and a single specimen may, in a few years, cover an area of many square yards. Several fine examples of this species may be seen on the grounds of the Arboretum. (Fig. 17)

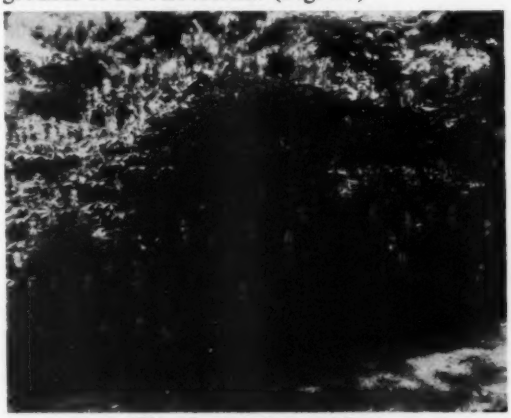


Fig. 17. ***Aesculus parviflora***

Hybrids

The number of hybrids or putative hybrids are, in proportion to the number of species, exceedingly large in the genus *Aesculus.* The exact origins of most such hybrids are not known. Some occurred in the wild, but the majority originated in cultivation.

[1] All photographs in this issue by Dr. E. J. Schreiner.

The Common Horse-chestnut of the Balkans was first introduced into France and England in the first half of the 17th century and into North America in the 18th century. The American species have been in cultivation since the latter part of the 18th century. As early as 1764 the American Sweet Buckeye, *A. octandra,* was introduced into England, and the Ohio Buckeye, *A. glabra,* was introduced in 1812. (Loudon 1838). Many species or varieties of American origin, however, did not occur in cultivation until the beginning of the present century. Thus, the numerous hybrids of the genus could not have appeared in cultivation, either in this country and in Europe, before the latter part of the 18th century, and actually many of the hybrids were noted only in the last 50 years.

A large number of hybrids are recorded as crosses among the American species, but the most celebrated hybrid is the Red Horse-chestnut, *A.* × *carnea,* supposedly a cross between the European *A. Hippocastanum* and the American *A. Pavia.*

This plant must have originated before 1818, the year Loiseleur, who first described the plant as *A. rubicunda,* received it from Germany, but as there are no earlier accounts of it, the exact origin is unknown. However, it was long considered as undoubtedly a chance hybrid between *A. Hippocastanum* and *A. Pavia,* as it possesses characters of both the supposed parents. Among the characters derived from the former are the leaves and the slightly spiny fruits. Characters derived from the latter are the color of the petals and the glands on their margins. The Red Horse-chestnut is a small tree usually about thirty feet in height. The flowers are red, with an orange blotch at the base of the petals which eventually become deep red.

Unlike most other hybrids, this plant breeds true from seed. This peculiarity, together with its hybrid nature, was later revealed by cytological studies. Hoar (1927) discovered that *A.* × *carnea* has 80 chromosomes while all the other species of the genus, including the two supposed parents, have 40. Thus this plant is a tetraploid, a plant with a double set of the normal diploid chomosome apparatus.

Aesculus × *carnea* was therefore presumably derived by the doubling of a sterile hybrid, which explains its capacity for breeding true from seed. This doubling of chromosome number was confirmed by Upcott (1936), who also found the chromosomes of the two parent species exactly similar in size and shape. These parent species, having 40 chromosomes, show secondary pairing and the formation of an occasional quadrivalent, a phenomenon suggesting that the parent species themselves are tetraploids and that the normal chromosome number of the genus is 20. The hybrid *A.* × *carnea* must therefore be regarded as an octoploid, a plant having a double chromosomal apparatus of a tetraploid.

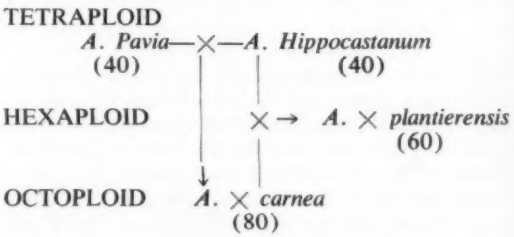
The leaves of *A.* × *carnea* are of a darker green than ordinary, of a firmer texture and with an even surface, and the short-stalks of the leaflets are more or less curved and twisted. These characters are attributable to the polyploidal nature of the plant, a plant having more than the normal diploid number of chromosomes. Its ability to resist drought better than the parent species is apparently also due to its hybrid nature.

The most interesting fact about hybridity in *Aesculus* is the occurrence of another hybrid, *A.* × *plantierensis,* a chance hybrid supposedly between *A. Hippocastanum* and *A.* × *carnea.* This plant was raised in the nurseries of Messrs. Simon-Louis Frères at Plantiéres near Metz, France, from a seed of *A. Hippocastanum* (André 1894). It is intermediate in characters between the two supposed parents. It has whitish flowers suffused with pink and fading to pink.

This supposition that *A.* × *plantierensis* is a back cross of an octoploid progeny to one of the tetraploid parents was later confirmed by Upcott (1936). He found the chromosome number to be 60, and therefore the plant is to be regarded as a hexaploid. This plant is a sterile one with its chromosomes consisting of varying numbers of univalents, bivalents, and multivalents.

This plant is also considered as a variety of *A.* × *carnea* as "var. *plantierensis*" (Rehder 1940). As its hybrid nature is definitely established, it will be more appropriately designated as *A.* × *plantierensis,* the name originally proposed for it by André.

The relationship and parentage of the several plants in consideration, illustrating as it does a most unique and striking case of hybridization, backcrossing and chromosome doubling in trees, can be summarized by the following diagram:



Among the numerous hybrids of garden origins between the American species, the most notable is the Hybrid Buckeye, *A.* × *hybrida,* a hybrid between *A. octandra* and *A. Pavia,* which originated before 1815. Its characteristics are intermediate between the two parental species. There

are several forms of this hybrid in cultivation with the color of the flowers varying from yellow slightly tinged with pink to nearly red throughout.

Many other hybrids have been cultivated since the beginning of the present century from plants which originated either in the garden or in the wild. In Rehder's Manual (Rehder 1940), there are listed 15 species of cultivated *Aesculus* and no less than 16 hybrids or supposed hybrids of known as well as unknown origins.

Fig. 18. An unusually handsome *Aesculus* of unknown origin.

On the ground of the Morris Arboretum there grows an unusually handsome *Aesculus* of unknown origin which may possibly be a new hybrid between *A. glabra* and *A. Hippocastanum,* as it shows characters intermediate between the two. The tree is especially notable because of its admirable form, dense branching, and thick non-shedding foliage which is of an excellent bright green turning a brilliant red in fall (Fig. 18). Particularly outstanding is the resistance of this foliage to leaf blotch disease, which browns the leaves of most species of *Aesculus* during the summer months, often rendering the trees unsightly. (Skinner 1949).

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ARBORETUM ACTIVITIES

(Continued from page 34)

School of Medicine, several fraternities and campus clubs and the faculties and graduate students of a number of schools and departments.

So popular has been this feature of the Arboretum's facilities that it is planned to double the size of the area for next year. Members of the Sphinx Senior Society have undertaken the construction of a new stone fireplace.

The Summer Course

For the second consecutive year the Arboretum offered a six-week course on Woody Ornamental Plants under the auspices of the Summer School of the University of Pennsylvania.

Of the eighteen students enrolled, eight were members of the graduate program in Landscape Architecture in the School of Fine Arts. The remainder were either high-school teachers of biology or persons interested in becoming acquainted with the important native and exotic trees, shrubs and woody vines which are hardy in this area.

As was the case last year, the study material was drawn from the rich resources of the Arboretum. Daily trips around the grounds enabled the students to study the living plants and thus to supplement the knowledge gained by identifying specimens in the laboratory.

In all some 500 species, belonging to about 200 different genera, of woody plants were covered and the members of the class made their own permanent collections for future reference.

(Continued on page 42)

Albizzia

J. M. Fogg, Jr. and Hui-Lin Li

The genus *Albizzia,* while of frequent occurrence both in the wild and in cultivation throughout the tropics, is seldom seen in the north temperate regions. Most of its species may be regarded as horticultural gems, with highly distinctive ornamental qualities. Among their desirable features are their gracefully spreading branches which form a low broad crown (Fig. 19), their delicate, feathery compound leaves, (Fig. 20) the exquisite, silken tassel-like nature of their flower clusters, (Fig. 21) and their unusually free and prolonged habit of flowering.

Fig. 19. *Albizzia julibrissin,* var. *rosea*

Botanically *Albizza* is interesting because it is the only genus of the subfamily Mimosoideae of the large Pea family that can be grown in the northern temperate climate. The Pea family or Leguminosae is divided into three subfamilies, Mimosoideae, Caesalpinioideae, and Paplionioideae, sometimes considered as three distinct families. The

Fig. 20. *Albizza julibrissin,* var. *rosea,* foliage and flower clusters.

Mimosoideae, the most primitive group of the three, differ from the others in having flowers with regular valvate petals and five to many stamens. It is almost exclusively tropical and subtropical in distribution.

Among the Mimosoideae, the genus *Albizzia* is most closely related to *Acacia,* a tree of common occurrence in tropical regions. The primary difference between the two lies in the stamens which are free in *Acacia* and united at the base in *Albizzia.*

The genus *Albizzia* includes some 25 species distributed in tropical and subtropical Asia, Africa, and Australia, with two in Mexico. They are deciduous trees or shrubs with bipinnate leaves, the leaflets being usually small and numerous. The often fragrant flowers are produced in stalked clusters, each with a small tubular 5-toothed calyx, a small corolla with the valvate petals united below, and with numerous long exserted stamens usually more or less connate at base. The calyx and corolla are usually whitish but the long stamens are often colored pink or yellowish which give the color to the flowers and flower-clusters. The regular flowers of *Albizzia* are thus very different from the typical paplionaceous or butterfly-like flowers of the Pea family in the temperate regions, but the large strap-

Fig. 21. *Albizzia julibrissin,* var. *rosea,* foliage and flower clusters.

shaped pod, similar to the fruit of all other leguminous plants, at once proclaims its kinship.

Among the many species of the genus, only two have their natural ranges in temperate regions in eastern Asia. *Albizzia julibrissin* occurs in Asia from Iran eastward to central China and Japan. This is a small tree with pink flowers. The leaves have 10-25 pinnae each with 40-60 small leaflets. Another species, *A. Kalkora,* occurs from eastern to central China, Indo-China and India. It is also a small tree but with whitish flowers. The leaves have 4-12 pinnae, each with 10-28 leaflets. This tree was formerly much confused with *A. Lebbek,* the Siris Tree or Lebbek Tree, of tropical Asia and northern Australia, a species frequently planted as a yard tree in the American tropics. *A. Lebbek* differs from the former primarily in the greenish yellow flowers and much longer pods.

The two species are now widely cultivated in tropical and subtropical countries all over the world, but they are also hardy in warmer temperate regions and can be grown in North America as far north as Washington, D. C. and the southern part of New Jersey along the eastern seaboard. *Albizzia julibrissin,* with its more finely divided leaves, is more graceful in appearance and more generally planted, while *A. Kalkora* is still relatively rare in cultivation. Moreover, *A. julibrissin* has a hardier variety, var. *rosea,* of smaller stature than the typical form and with brighter pinkish flowers. This species can be grown in the eastern United States as far north as Massachusetts.

A. julibrissin, generally known as the Silk Tree, is now a common plant in the southern part of the United States where it is often escaped and widely naturalized. But the hardy variety, valuable and interesting as it is, is not widely planted in the north.

Like other species of *Albizzia,* the Silk Tree is highly ornamental. The slender trunk has a smooth pale gray bark. The large, finely divided, feathery leaves and the showy clusters of silken flowers create a truly tropical effect in landscaping. The small stature and the wide-spread crown make this tree especially desirable to match the low type of houses now so prevalent.

This low stature, together with the slow growing habit, makes this tree a highly commendable one for street planting in suburban areas. There is little possibility in damaging by overhead utility wires in storms. The wide-spread crown covers a great area and yet the shade is not dense. In the summer, the showy flowers, usually lasting from late June to mid-September, present a sight unsurpassed by any other tree.

The *Albizzia* are sometimes known as "Mimosa Trees" because of their resemblance to *Mimosa,* the Sensitive Plant. The leaves and leaflets in *Albizzia* are also sensitive but they do not respond instantaneously to touch and other stimulations as is the case in most species of *Mimosa.* They are, however, sensitive to light and the leaflets close slowly at dusk and open up again in the morning. Also, in *Mimosa* the number of stamens equals or is double that of the petals, whereas in *Albizzia* the stamens are more than twice as many as the lobes of the corolla.

Propagation of *Albizzia* can be readily effected by seeds or by cuttings from half-ripened wood. The tree is also of easy culture as it grows well in a variety of soils. It thrives best in sunny and moist places but grows well also in relatively dry situations. *A. Kalkora* is a fast grower and a taller tree, attaining to a height of 55 feet. *A. julibrissin* is a slow growing tree with a height of about 35 feet, while the hardy variety *rosea* is lower and attains to a height of only 20-25 feet. There is a fine specimen of var. *rosea* in the Arboretum located on the northern side of the Rose Garden (Fig. 19). While in bloom during July and August this tree attracts considerable attention and the numerous comments we have received concerning it have impelled us to make plans for distributing seedlings to our Associates in the near future.

At the home of the senior author in Mt. Airy are two plants of var. *rosea,* now about 16 years old and some 25 feet tall. Careful records have been kept of their blooming dates and it is of interest to note that the average date of appearance of the first flowers is June 28 and that they bloom continuously until about September 15.

Book Review

CHINESE FLOWER ARRANGEMENT, by H. L. Li. Hedera House, Box 4315, Philadelphia 18, Pa. 1956. xii + 122 pages. Illustrated. $4.00.

Associates of the Morris Arboretum may secure copies at the special rate of $3.50.

At the very start of this book, one learns that in China, flower arrangement is not a hobby or even a specialized study; it is an integral part of the culture of an old civilization. An arrangement of flowers in the hallway or study of a Chinese house is not only carefully planned to harmonize with surrounding accessories, the season, and the occasion, but is also steeped in symbolic meaning. For instance, the straightness of bamboo becomes symbolic of straightforwardness in life and the full bouquet of flowers can be used to celebrate hopes fulfilled. Dr. Li gives a detailed account of the various trees and flowers used for arrangements, according to the season when they are available. Many are familiar to us here but the mainstay of winter arrangements, the Japanese Apricot *(Prunus mume)* is not often seen.

The title is misleading, for far more is covered than what Dr. Li calls "vase arrangement." There is a full discussion of table culture or miniature gardening, more familiar to us in its Japanese form of Bon-sai, an art that is fascinating to the impatient occidental. Plants used for dwarfing are listed and cultural methods are described.

Students of ceramics and metal craft will be interested in the chapter on receptacles, the designing and making of which are yet another of China's contributions to the art of the world. A number of good illustrations help to show the intricate and delicate beauty of these vases and bowls.

Dr. Li's book deserves the attention of any reader who has an interest in plants or flowers indoors. He knows his subject well and the book has the ring of authenticity. His style, which I find charming, may be too formal for some readers. This, however, should not deter them from using this book as a reference.

The task of explaining flower arrangement as an art form is not easy, nor can a method of artistic expression that has evolved over centuries be fully understood by westerners contemplating it for the first time. For me, Dr. Li has opened the door to a world of new ideas. He has given me a glimpse of a different concept of the use of plants and flowers for interior decoration.

Ernesta Ballard
August, 1956

ARBORETUM ACTIVITIES

(Continued from page 34)

In addition to learning to recognize the species studied in this course, the students received instruction concerning their horticultural value and ecological needs. Attention was given to the basic problems of plant breeding and to the methods whereby woody plants are propagated.

Staff and Personnel Changes

During the past year the Arboretum has experienced a number of changes in staff and personnel. In January we lost the services of a valuable staff member, Martha H. Starr, our Propagator. Mrs. Starr resigned to devote her entire attention to an increasing family. However, we have been fortunate to secure in her place Miss Mary O. Milton, a graduate of the Pennsylvania School of Horticulture at Ambler. Miss Milton was with us part-time from February until July when she was appointed a full-time member of the staff.

John Dourley, a native of Scotland, has accepted the newly created position of Assistant Superintendent of Grounds. Mr. Dourley is unusually well qualified for this post, having received his training at the Royal Botanic Garden in Edinburgh, where he was subsequently employed as Gardner, and having also worked in conjunction with the Botany Department of the University of Edinburgh.

Another new position, Assistant Custodian of Buildings and Machinery, has been filled by the appointment of Henry J. Burns. Mr. Burns was recently promoted from the hourly payroll to this responsible post on the regular grounds force.

Two young men whom the Director met in the course of his travels in India have come to the Arboretum for a year's stay. Dr. P. D. Varadarajan of the Botany Laboratory of the University of Madras is here on a post-doctoral research grant, and Mr. P. V. Rajappan, who was employed in the Agricultural Department of the Government of Madras, is working as a gardener with special duties in the greenhouses.

The Arboretum mourns the loss of its Label Maker and Mechanic, George H. Campbell. Mr. Campbell died last May after having been with the Arboretum for thirteen years. His friendly personality, as well as his skilled services, are sadly missed.

New Associates

The Arboretum is happy to welcome the following new Associates who have been enrolled since last September:

Mrs. H. Paul Abbott
Dr. Francis Adler
Dr. Henry B. Allen
Mrs. F. Edward Atkins, Jr.
Mrs. Charles C. Bachman
Mr. Clifford J. Backstrand
Mrs. Robert L. Bast
Mrs. Charles E. Bean
Mr. Charles Becker, Jr.
Mrs. Wm. H. Boardman
Mrs. James Bond
Mrs. Henry H. Bonnell
Mr. and Mrs. Beauveau Borie, III
Mr. Francis Boshan
Mrs. Francis Boyer
Mrs. Joseph Bright
Mrs. John Penn Brock
Miss Eliczabeth Norris Brock
Mr. Clarence M. Brown
Mrs. Herbert Brown
Dr. Merlin M. Brubaker
Mr. James Bush-Brown
Mrs. Orville H. Bullitt
Miss Gertrude S. Butler
Mr. Charles C. Butterworth
Mr. John E. Canaday
Dr. John Carson
Mr. Arthur T. Chamberlain
Mrs. Edward M. Cheston
Mrs. Morris Cheston
Mrs. J. Horace Churchman
Mr. and Mrs. John W. Claghorn
Mr. Clement J. Clarke, Jr.
Mr. Lloyd M. Coates
Mr. and Mrs. Francis R. Cope, Jr.
Mr. Lammot du Pont Copeland
Mr. John W. Cornell, Jr.
Mrs. Bolton L. Corson
Mrs. Henry B. Coxe
Mrs. Gordon Crouter
Mr. William Crowder
Mrs. Francis B. Crowninshield
Mrs. Elliot Daland
Miss Eleanor W. David
Miss Eleanor B. Davis
Mrs. Helena Day
Mr. and Mrs. Robert Dechert
Mrs. William F. Delafield
Miss Meribah Delaplaine
Dr. and Mrs. Charles Q. DeLuca
Mr. William E. Denk
Mrs. R. Meyer de Schauensee
Mrs. John L. DeTar
Mr. Howard Detweiler
Mrs. Antelo Devereux
Mrs. John H. Dilks
Mr. Leonard C. Dill, Jr.
Mrs. Benjamin Dintenfass
Mrs. Widener Dixon
Mr. and Mrs. Donald D. Dodge
Mrs. Brooke Dolan
Mr. and Mrs. John W. Doriss, Jr.
Mrs. John T. Dorrance
Mrs. Lawrence Drake
Mrs. Joseph N. DuBarry
Miss Gertrude S. Ely
Mr. Carl A. Erikson
Mrs. Charles G. Erny
Mrs. F. Algernon Evans
Mrs. Edward Fernberger
Dr. and Mrs. Samuel W. Fernberger
Mr. and Mrs. Thomas A. Fernley, Jr.
Mrs. Hugh W. Field
Mrs. Bruce Ford
Mrs. Caleb F. Fox
Mr. and Mrs. John L. Frey
Mrs. James C. Gentle
Dr. and Mrs. David R. Goddard
Mrs. William H. Godfrey
Mrs. James Gowen
Mrs. F. C. Grant, Jr.
Mrs. Albert M. Greenfield
Mrs. W. Griffin Gribbel
The Misses Grotz
Dr. and Mrs. F. Otto Haas
Dr. and Mrs. Gaylord P. Harnwell
Mrs. Flagler Harris
Mrs. Alexander Hemphill
Mr. Edwin S. Henry, Jr.
Mrs. J. Norman Henry
Miss Josephine deN. Henry
Mrs. T. Charlton Henry
Mrs. W. Okley Hermance
Mrs. Dunham Higgins
Mrs. Charles Hodge IV
Mr. Edward Hopkinson, Jr.
Mrs. Orville Horwitz
Mrs. Roy Arthur Hunt
Dr. and Mrs. Norman R. Ingraham
Mr. J. Allan Irvine
Mrs. Albert Atlee Jackson
Miss Mabel Steele Jones
Mrs. T. Carrick Jordan
Miss E. Jane Keagy
Mrs. Donald W. Kent
Mrs. Wm. Fulton Kurtz
Dr. and Mrs. Edwin L. Lame
Dr. Austin Lamont
Mrs. Henry W. Large
Mrs. Louis L. Larson
Mr. and Mrs. Sydney Lea
Mr. William S. Leary
Dr. Carl A. LeCleire
Miss Jean Gordon Lee
Mrs. P. Blair Lee
Mrs. James A. Lehman
Mrs. John F. Lewis, Jr.
Mr. James Gerhard Leiper
Mrs. William E. Lingelbach, Jr.
Longwood Gardens
Miss Mary H. Lovering
Mrs. Howe Low
Mr. and Mrs. Lewis N. Lukens
Mr. and Mrs. Scott Maddux
Mr. Sydney E. Martin
Mrs. James G. Masland
Mr. Robert McLean
Mrs. William McClenahan

Mr. Robert T. McCracken
Mrs. J. Aubrey McCurdy
Mrs. Robert R. Meigs
Mrs. James F. Mitchell, Jr.
Mrs. W. B. Mitchell
Mr. C. C. Morris
Mrs. J. Cheston Morris
Mrs. Frederick W. Morris
Mr. George L. Morris
Mrs. Stephen A. Murphy
Mrs. Joseph A. Musselman
Mr. Albert Nalle
Mrs. Richard T. Nalle
Mr. and Mrs. James M. Newell
Mr. Vernon D. Northrop
Mrs. George C. Nutting
Mr. Nelson Ogden
Mrs. Allen S. Olmsted
Mr. Jesse D. Otley
Mrs. Garrett D. Pagon
Mr. and Mrs. Stephen Pearson
Mr. Frederick W. G. Peck
Mr. J. Liddon Pennock, Jr.
Mr. William Pepper
Mrs. T. Morris Perot, 3rd
Mrs. Joseph N. Pew, Jr.
Mrs. Charles M. Phelps
Mrs. Edgar Allan Poe
Mrs. John N. Pomeroy, Jr.
Mrs. Philip Price
Mrs. George Reath
Mrs. Thomas Reath
Mrs. Walter Rebmann
Miss Eleanor M. Reeves
Mr. Henry G. Reifsnyder
Mrs. Chester A. Rhea
Mrs. Charles E. Rickards
Mr. and Mrs. F. M. Rivinus
Mr. George A. Robbins
Dr. H. Radclyffe Roberts
Mr. Charles Robertson
Mr. Wolcott W. Robinson
Mrs. Nicholas G. Roosevelt
Mrs. Lessing J. Rosenwald
Mrs. Donald P. Ross
Miss Anne Rowland
Mrs. Karl Rugart
Mr. and Mrs. W. Miles Ryan
Mrs. Fannie R. Sackett
Mrs. Ernest C. Savage
Mrs. Ernest Scott
Mrs. Richard H. L. Sexton
Mrs. Edwin S. Sheffield
Dr. and Mrs. John Shober
Miss Elsie B. Sinkler
Mr. James M. Skinner, Jr.
Mrs. Charles C. Smith
Mrs. Richard C. Smith
Mr. and Mrs. J. Somers Smith, Jr.
Mrs. J. Solis-Cohen, Jr.
Mrs. Edward Starr, Jr.
Dr. Isaac Starr
Mrs. Ralph T. Starr
Mrs. Charles G. Stehle
Mrs. Ford W. Stevens
Mrs. T. E. Stieber
Mr. L. P. Stradley, Jr.
Mrs. Howard Taylor, Jr.
Mrs. Thomas D. Thacher
Mrs. Charles I. Thompson
Mr. Richard Thomson
Mr. John W. Thorn
Mr. Chester E. Tucker
Mrs. Carroll S. Tyson
Mr. and Mrs. Charles R. Tyson
Mrs. J. B. Van Sciver, Jr.
Mrs. Joseph B. Van Sciver
Mr. Louis G. Wacker
Mrs. Nicholas B. Wainwright
Dr. Joseph Waldman
Mr. E. Perot Walker
Mrs. Henry M. Watts, Jr.
Mrs. L. B. Wentz
Mr. and Mrs. Albert C. Weymann, Jr.
Mr. Francis D. Wetherill
Mrs. W. Beaumont Whitney, 2nd
Mrs. Margaret Whitney
Mr. Thomas Whyte, Jr.
Mrs. Harral Williams
Mrs. Charles Willing
Mrs. John Winstersteen
Mr. and Mrs. Elias Wolf
Mrs. Morris Wolf
Mrs. Edward F. R. Wood
Mrs. Richard D. Wood, Jr.
Mrs. Richard D. Wood, II
Mrs. Thompson Wood
Mr. William P. Wood
Mrs. C. Stewart Wurts, Jr.
Mr. and Mrs. D. Robert Yarnall
Mrs. Carl Zigrosser
Mrs. Mildred G. Zink